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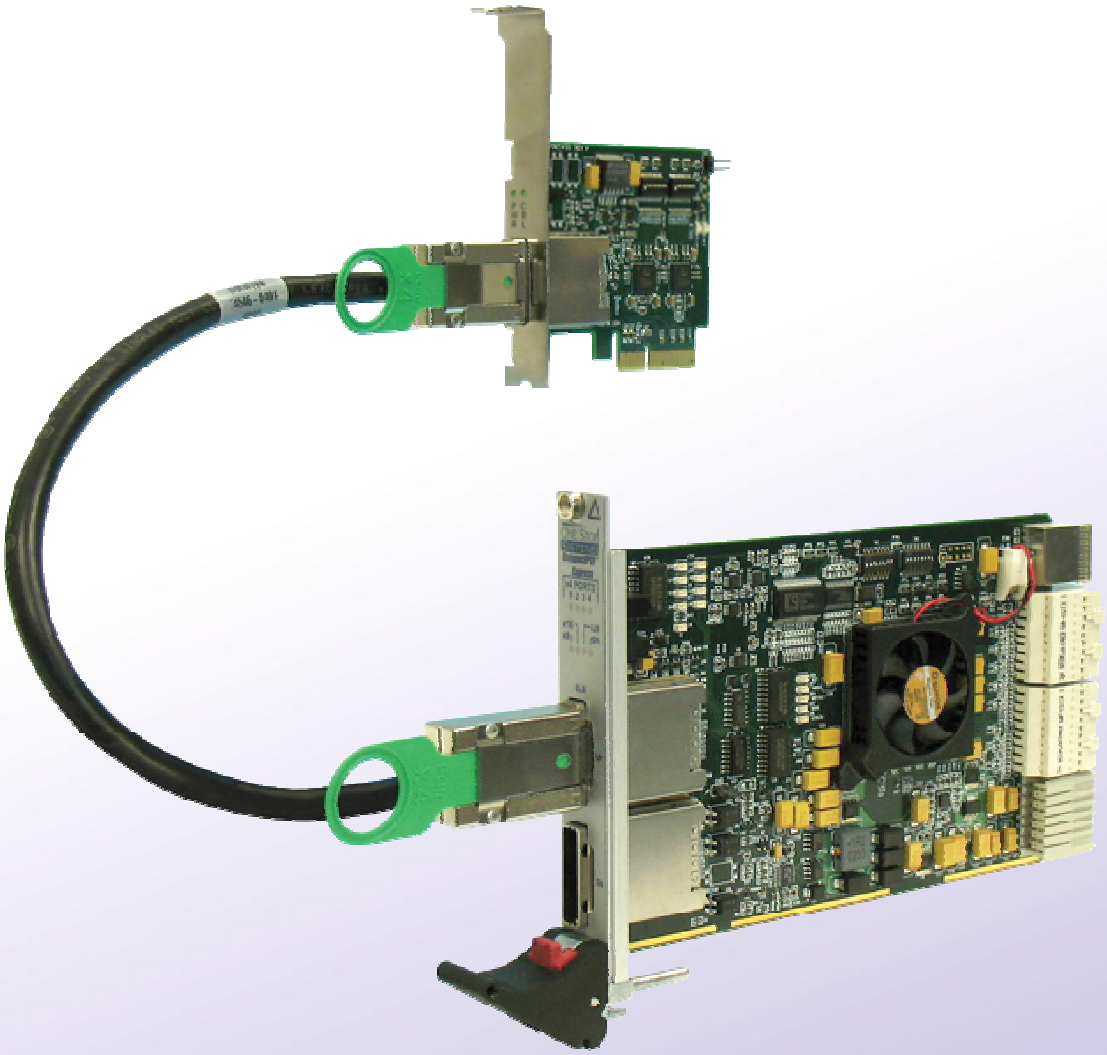

User Manual,
Host server to expansion system kit

(OSS-KIT-EXP-6000)

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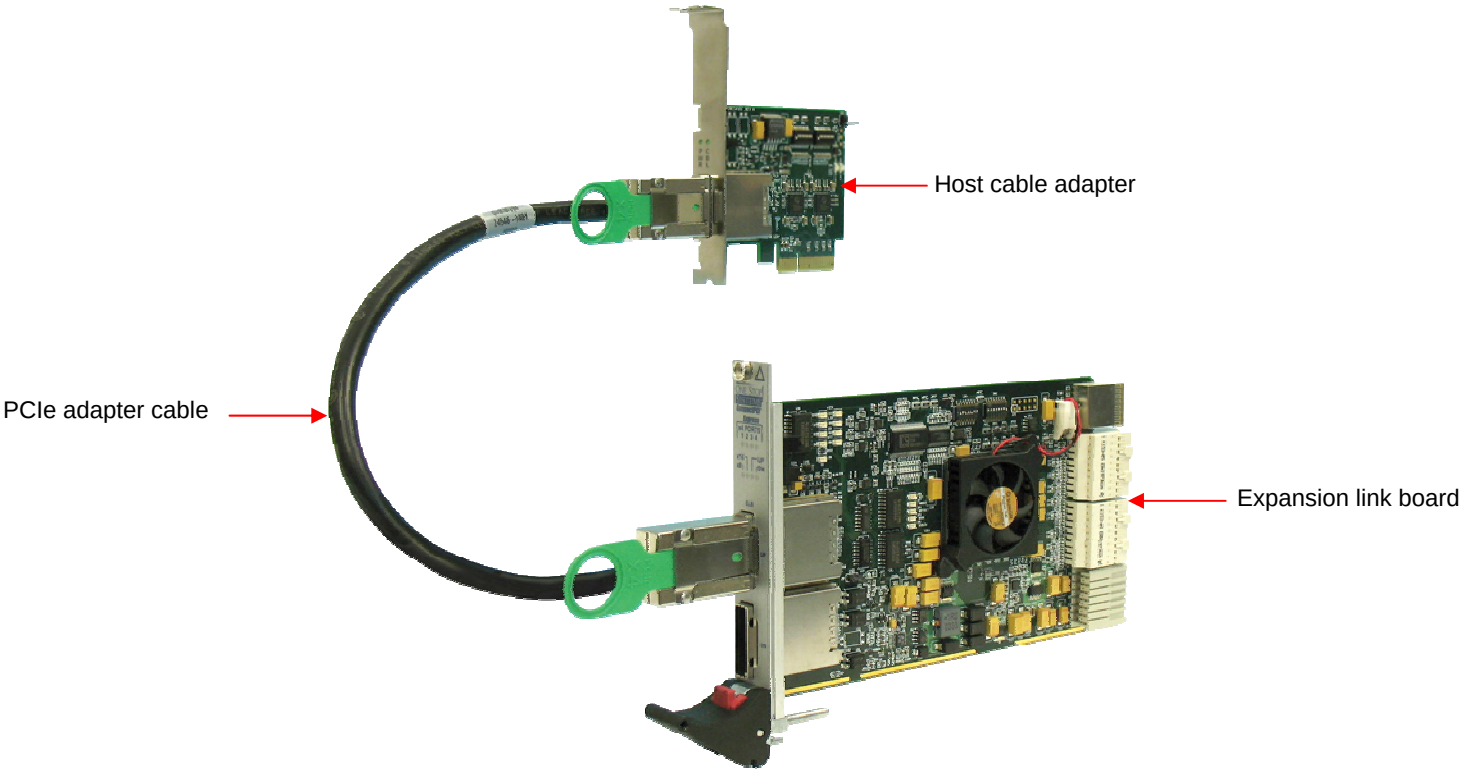
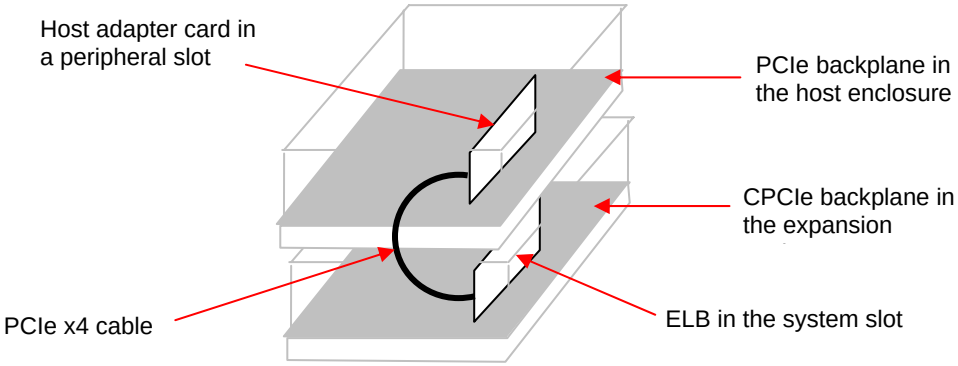
1. Overview

1.a. Description

The PCIe x4 expansion kit is used to extend the PCI express bus from a host server to an external expansion chassis. The host adapter card inserts into a PCIe slot of the server. It then cables to a downstream expansion link board (ELB). The ELB acts as a downstream cable link board and the primary fan-out switch to support multiple configurations of PCI express expansion slots. The host adapter installs into a PCIe x4, x8 or x16 slot on the host motherboard. It then cables to the expansion link board and installs in the SHB or system slot of a CPCI backplane.

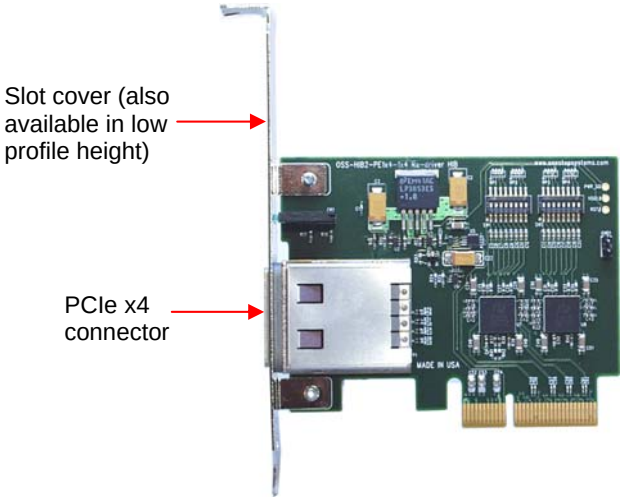


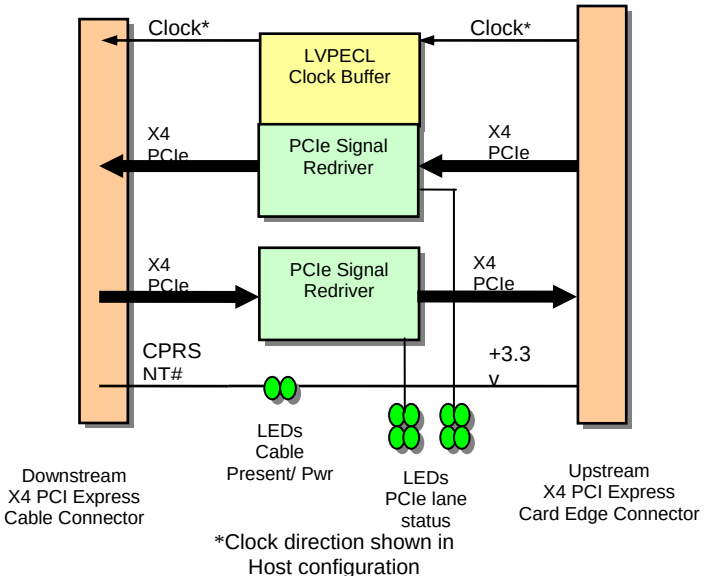


2. Components

2.a. Host cable adapter

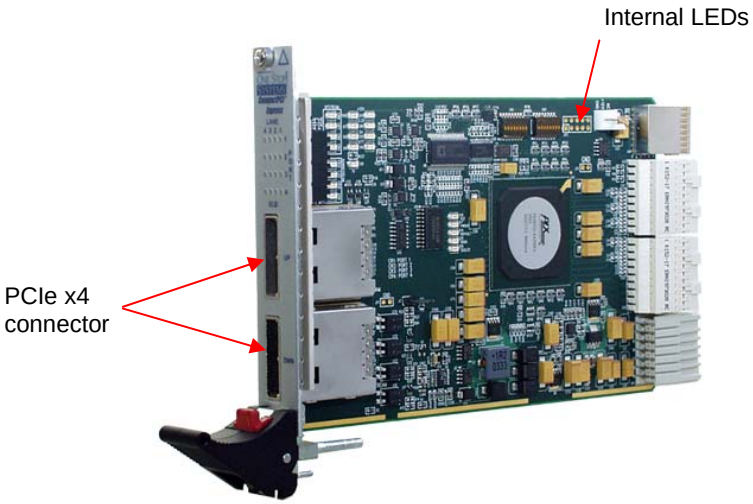
The PCIe x4 host adapter installs in the host computer's PCIe x4, x8 or x16 slot.





2.b. Expansion link board

The Expansion Link Board (ELB) OSS-CPCIe-3U/6U-ELB-x4 is a downstream link board that installs into a CPCIe chassis. The ELB fits into the system slot of a CPCIe backplane. The ELB is the downstream link board and the primary fan-out switch to support multiple configurations of CPCI or CPCIe expansion slots.



2.c. Host Adapter Specifications

Form Factor	x4 PCIe add-in card
Dimensions (H x L)	2.713 x 3.354" (68 x 86mm)
Front Panel Connectors	One PCIe x4 cable connector
Front Panel Indicators	Power On / Cable Present LEDs
Redriver	Pericom PI2EQX4402
Temperature Range	0° to 50°C (32° to 122°F)
Relative Humidity	10 to 90% non-condensing
Shock	30g acceleration peak (11ms pulse)
Vibration	5-17 Hz 0.5” double amplitude displacement; 7-2000Hz, 1.5g acceleration
Power Consumption	3.75W typical, 3.3@1.3A
Agency Compliance designed to meet but not tested	UL60950, FCC Class B, CE safety and emissions

2.d. Expansion Link Board Specifications

Form Factor	PICMG 1.3 SHB Express system slot compliant
Dimensions (H x L)	3.937 x 6.299 in (100 x 161 mm), 1 slot wide
Switch	PLX PEX8532 32 lane switch
External Interface	Two x4 PCIe Cable Rev. 0.4 ports
Downstream Interface	16 lanes of PCI Express on the backplane connectors are auto configurable on the card edge connectors as: :: Two x8 PCIe links :: Four x4 PCIe links
Front Panel Connectors	Molex 75586-0010 Front Panel Indicators:|:: Bank of 4 upstream lane active indicators (green) :: Bank of 8 downstream link active indicators (green)
Internal Indicators	:: Power In-range Indicators for +12V, +3.3V & VTT (red/green) :: Power on indicator for +1V (green) :: Bank of 5 board status indicators (red)
Power consumption	10W typical +12V @ .5, 3.3V @ 1.25A, 5Vaux @ 2.5mA
Operating Environment+	• Temperature Range: 0° to 70°C (32° to 122°F) • Relative Humidity: 10 to 90% non-condensing • Shock: 30g acceleration peak (11ms pulse) • Vibration: 5-17 Hz 0.5” double amplitude displacement; 7-2000Hz, 1.5g acceleration
Agency Compliance+	UL 60950, FCC Class B, CE safety and emissions
Warranty	Two years

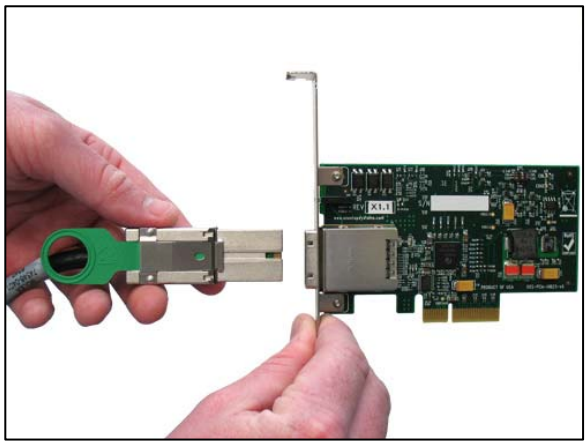
3. Installation Instructions

3.a. Installing the Adapter Kit

1) Install the host cable adapter into an appropriate PCIe slot of the host computer. NOTE: For example, a PCIe x8 host board can be installed in a PCIe x16 or a x8 slot. It will still operate at x8 speeds.

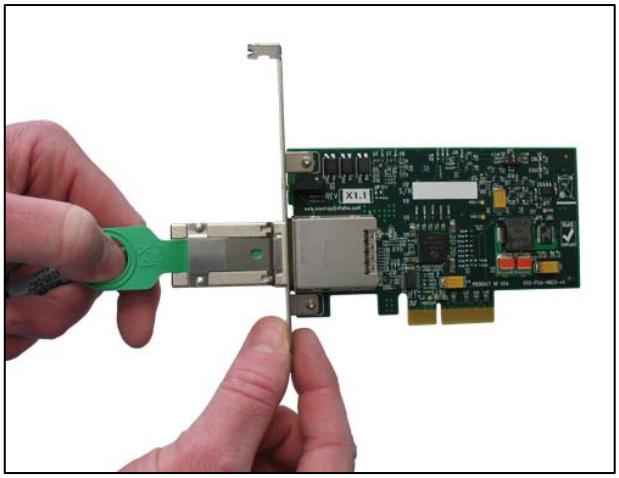
3.b. When using with the 2-slot Backplane:

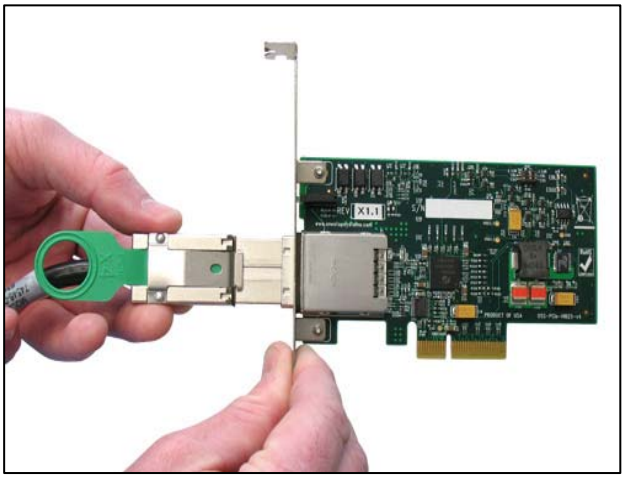
2) Install the expansion link board into the system host slot on the expansion system.
3) Connect the PCIe cable to both cable adapters.
    a) Pull back on the tab, lifting the prongs that insert in the holes on the PCIe connector.
    b) Push in the connector.
    c) Release green thumb tab insuring that the prongs are fully engaged in the mating connector.
    d) Test by pulling back on the connector.



3.c. Removing PCIe cable:

1) To remove PCIe cable pull back on green thumb tab to release metal pins and gently separate.

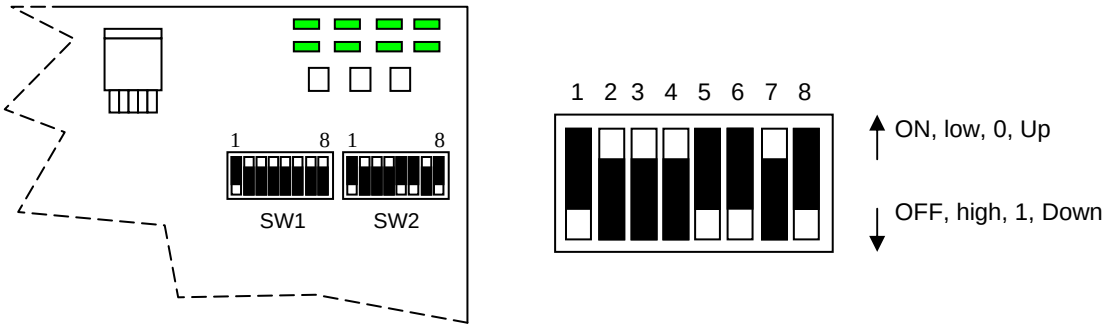




4. Technical Information

4.a. Host adapter card switch settings

The OSS HIB2-x4 contains two x8 micro switches that allow configuration of the Pericom PI2EQX4402D's equalization, amplification and de-emphasis circuitry. The two switches, SW1 and SW2, are located above the Pericom devices on the front side of the PCB.



SW1 and SW2 Switch Location and Orientation

Switch SW1 Settings

Switch #	Signal Name	Default*	Comments
1	ENABLE	Down	Up = Disable all Lanes Down = Normal operation
2	RX_SEL0	Up	Rx Equalizer Selection See Table 1
3	RX_SEL1	Up	
4	RX_SEL2	Up	
5	RX_SEL3	Up	Rx Amplifier Selection See Table 2
6	RX_SEL4	Up	
7	RX_SEL5	Up	Rx De-Emphasis Selection See Table 3
8	RX_SEL6	Up	

Switch SW2 Settings

Switch #	Signal Name	Default *	Comments
1	N/C		Not connected
2	TX_SEL 0	Up	Tx Equalizer Selection See Table 1
3	TX_SEL 1	Up	
4	TX_SEL 2	Up	
5	TX_SEL 3	Down	Tx Amplifier Selection See Table 2
6	TX_SEL 4	Down	
7	TX_SEL 5	Up	Tx De-Emphasis Selection See Table 3
8	TX_SEL6	Down	

Table 1

2	3	4	Equalization
0	0	0	No Equalization
0	0	1	1.5db @ 1.25 GHz
0	1	0	2.5db @ 1.25 GHz
0	1	1	3.5db @ 1.25 GHz
1	0	0	4.5db @ 1.25 GHz
1	0	1	5.5db @ 1.25 GHz
1	1	0	5.5db @ 1.25 GHz
1	1	1	7.5db @ 1.25 GHz

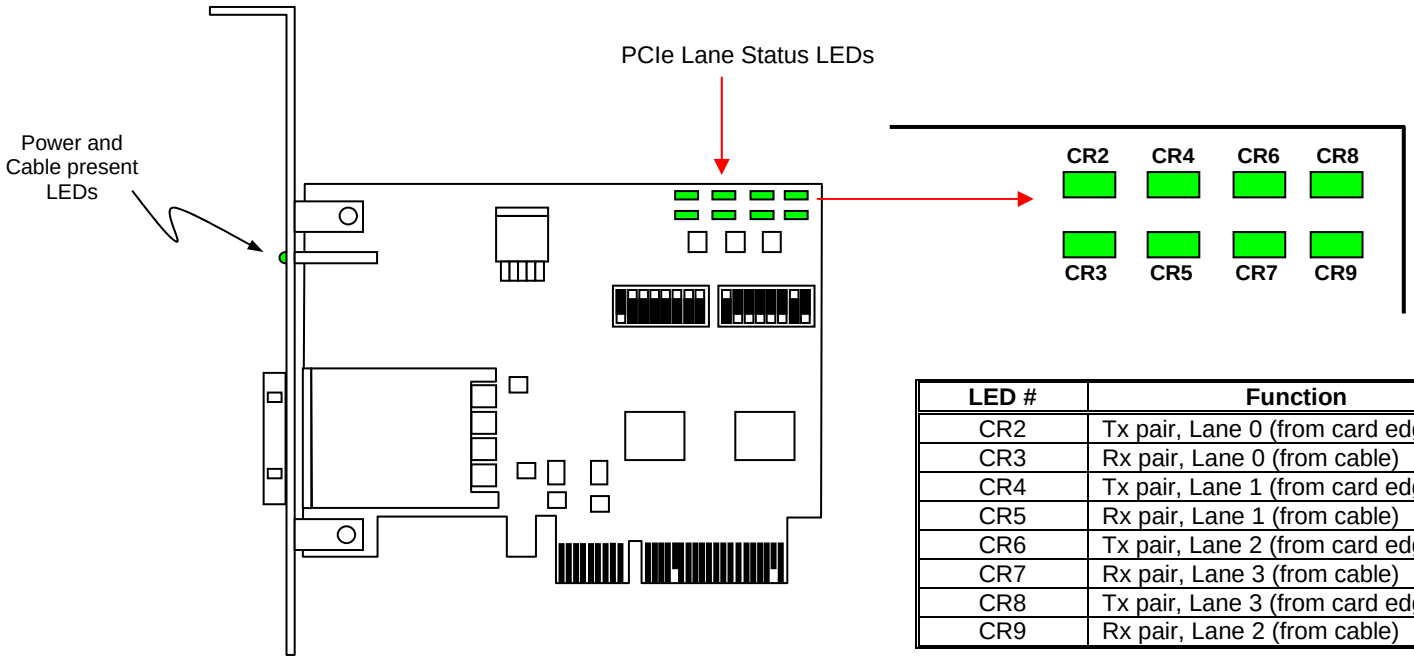
Table 2

5	6	Swing
0	0	1x
0	1	0.8x
1	0	1.2x
1	1	1.4x

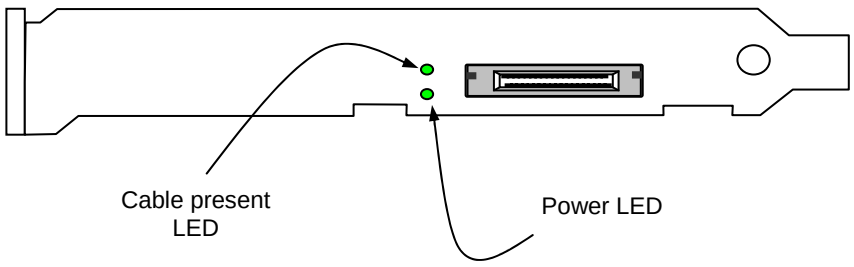
Table 3

7	8	De-emphasis
0	0	0db
0	1	-2.5db
1	0	-3.5db
1	1	-4.5db

4.b. Host cable adapter LEDs



LED #	Function
CR2	Tx pair, Lane 0 (from card edge)
CR3	Rx pair, Lane 0 (from cable)
CR4	Tx pair, Lane 1 (from card edge)
CR5	Rx pair, Lane 1 (from cable)
CR6	Tx pair, Lane 2 (from card edge)
CR7	Rx pair, Lane 3 (from cable)
CR8	Tx pair, Lane 3 (from card edge)
CR9	Rx pair, Lane 2 (from cable)



4.c. Pin Assignments

Host adapter card connectors PCIe x4 Card Edge Connector

- The pins are numbered as shown with side A on the top of the centerline on the solder side of the board and side B on the bottom of the centerline on the component side of the board.
- The PCIe interface pins PETpx, PETnx, PERpx, and PERnx are named with the following convention: “PE” stands for PCIe high speed, “T” for Transmitter, “R” for Receiver, “p” for positive (+), and “n” for negative (-).
- Note that adjacent differential pairs are separated by two ground pins to manage the connector crosstalk.

Pin-out for the PCIe x4 Card Edge Connector on the Host Cable Adapter

Pin #	Side B		Side A	
	Name	**Description**	**Name**	**Description**
1	N/C	N/C	PRSNT1#	Hot-Plug presence detect
2	N/C	N/C	N/C	N/C
3	N/C	N/C	N/C	N/C
4	GND	Ground	GND	Ground
5	NC	N/C	N/C	Not connected
6	N/C	N/C	JTAG3	TDI (Test Data Input)
7	GND	Ground	JTAG4	TDO (Test Data Output)
8	+3.3V	3.3 V power	N/C	Not connected
9	N/C	Not connected	N/C	Not connected
10	3.3Vaux	3.3 V auxiliary power	+3.3V	3.3 V power
11	N/C	N/C	PERST#	Fundamental reset
Mechanical key				
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference clock (differential pair)
14	PETp0	Transmitter differential pair, Lane 0	REFCLK	
15	PETn0		GND	Ground
16	GND	Ground	PERp0	Receiver differential pair, Lane 0
17	PRSNT2#	Hot-Plug presence detect	PERn0	
18	GND	Ground	GND	Ground
19	PETp1	Transmitter differential pair, Lane 1	RSVD	Reserved
20	PETn1		GND	Ground
21	GND	Ground	PERp1	Receiver differential pair, Lane 1
22	GND	Ground	PERn1	
23	PETp2	Transmitter differential pair, Lane 2	GND	Ground
24	PETn2		GND	Ground
25	GND	Ground	PERp2	Receiver differential pair, Lane 2
26	GND	Ground	PERn2	
27	PETp3	Transmitter differential pair, Lane 3	GND	Ground
28	PETn3		GND	Ground
29	GND	Ground	PERp3	Receiver differential pair, Lane 3
30	RSVD	Reserved	PERn3	
31	PRSNT2#	Hot-Plug presence detect	GND	Ground
32	GND	Ground	RSVD	Reserved

Notes:

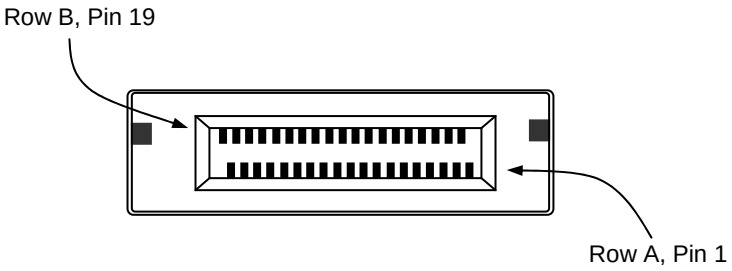
1. Optional signals that are not implemented are left as no connects on the board side connector.

2. Reserved signals are no connects on the board side connector.

3. Although support of CWAKE# is optional from the board side connector perspective, an allocated wire is mandated for the cable assembly.

4. Board side pin-outs on both sides of the link are identical. The cable assembly incorporates a null modem for the PCIe transmit and receive pairs.

4.d. PCI Express x4 Connector Pin Assignment



Pin-out for the PCIe x4 Cable

Pin #	Cable Side 1		Cable Side 2	Pin #
A1 A4 A7 A10 A13 A16 B1 B4 B7 B10 B13	GND	Drain Wires	GND	A1 A4 A7 A10 A13 A16 B1 B4 B7 B10 B13
A2	PETp0	Differential Pair	PERp0	B2
A3	PETn0		PERn0	B3
A5	PETp1	Differential Pair	PERp1	B5
A6	PETn1		PERn1	B6

Pin #	Cable Side 1		Cable Side 2	Pin #
A8	PETp2	Differential Pair	PERp2	B8
A9	PETn2		PERn2	B9
A11	PETp3	Differential Pair	PERp3	B11
A12	PETn3		PERn3	B12
A14	CREFCLK+	Differential Pair	CREFCLK+	A14
A15	CREFCLK		CREFCLK-	A15
A17	SB_RTN	Hook-up Wire	SB_RTN	A17
A18	CPRSNT#	Hook-up Wire	CPRSNT#	A18
A19	CPWRON	Hook-up Wire	CPWRON	A19
B2	PERp0	Differential Pair	PETp0	A2
B3	PERn0		PETn0	A3
B5	PERp1	Differential Pair	PETp1	A5
B6	PERn1		PETn1	A6
B8	PERp2	Differential Pair	PETp2	A8
B9	PERn2		PETn2	A9
B11	PERp3	Differential Pair	PETp3	A11
B12	PERn3		PETn3	A12
B14	PWR	NC	PWR	B14
B15	PWR	NC	PWR	B15
B16	PWR_RTN	NC	PWR_RTN	B16
B17	PWR_RTN	NC	PWR_RTN	B17
B18	CWAKE#	Hook-up Wire	CWAKE#	B18
B19	CPERST#	Hook-up Wire	CPERST#	B19
Backshell	Chassis Ground	Overall Cable Braid	Chassis Ground	Backshell

4.e. Signal Descriptions

PETp(x)	PCI Express Transmit Positive signal of (x) pair.
PETn(x)	PCI Express Transmit Negative signal of (x) pair.
PERp(x)	PCI Express Receive Positive signal of (x) pair.
PERn(x)	PCI Express Receive Negative signal of (x) pair.
CREFCLK+/-	Cable REFerence CLocK: Provides a reference clock from the host system to the remote system.
SB_RTN	Side Band ReTurN: return path for single ended signals from remote systems.
CPRSNT#	Cable PReSeNT: Indicates the presence of a device beyond the cable.
PWR	PoWeR: Provides local power for in-cable redriver circuits. Only needed on long cables. Power does not go across the cable.)
PWR_RTN	PoWeR ReTurN: Provides local power return path for PWR pins.
CWAKE#	Cable WAKE
CPERST#	Cable PCI Express Reset

4.f. Expansion link board switch settings

Downstream PCIe ports hardware strapping logic

CFG(0:2)			BP PORT CFG				
0	1	2	A0	A1	A2	A3	B0
0	0	0	x4	x4	x4	x4	x4
0	1	0	x8	0	x4	x4	x4
0	1	1	x8	0	x8	0	x4
1	x	x	x16	0	0	0	x4

5. Ordering Information

OSS-KIT-EXP-6000

PCIe x4 expansion kit includes a PCIe x4 Gen 1 host cable adapter OSS-PCIe-HIB2-x4-H), a CPCIe x4 expansion link board (OSS-CPCIe-3U-ELB-x4), and a PCIe x4 2M cable.

Related Products

OSS-PCIe-HIB2-x4-H-Host adapter card

OSS-CPCIe-3U-ELB-x4-CPCIe expansion Link board